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THE GROWTH OF *RAMALINA RETICULATA*.

(WITH ONE FIGURE)

RAMALINA RETICULATA (Noehd.) Krempelh., so characteristic of the coast valleys of California, offers to the plant physiologist a particularly fruitful field for the study of the growth, apothecial development, and dissemination of lichens.

TUCKERMAN states¹ that his longest specimens were a little more than

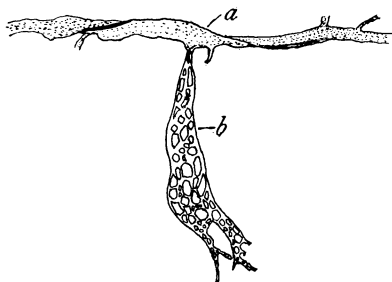


FIG. 1.—*Ramalina reticulata*: A, thallus branch; B, lobe; C, knot of silk used to designate measured lobes.

a foot in length, and that the widest perforated expansions exceeded 20^{mm}. Just what dimensions this plant may attain I am not prepared to state, but I agree with Dr. Peirce that it is probably the largest of our North American lichens. Specimens four and five feet long are common on the trees about Stanford University, their widest perforated expansions reaching two feet or more. Specimens in my herbarium vary from those of the most delicate lace-like structure to those having broad, unperforated expansions 25 to 40^{mm} in width, dimensions much greater than the largest

perforated specimens seen by Tuckerman. *Usnea longissima* Ach. attains a length of eight or nine feet on the redwoods of the Santa Cruz mountains, but the thallus is so slender that its real size is much less than that of *Ramalina reticulata*.

The plant is evidently such a rapid grower that last September a series of measurements were made, at the suggestion of Dr. G. J. Peirce, in order to obtain some definite results. The lengths in the column under September are the measurements made September 25, 1903; those under May were made May 5, 1904, an interval of seven months and ten days. The winter rains did not begin for nearly two months after the measurements were made, and ceased two or three weeks before the lichens were remeasured, so that most of the growth was confined to a period of about five months. During the late winter and early spring growth must have been both rapid and continuous, since for nearly two months it rained almost daily, the temperature also being favorable for growth.

The thallus was measured from the point of attachment, the lobes measured being marked by a knot of silk thread, the weight of which was so inconsiderable as to have no effect on the growth. The measurements

¹ Synopsis N. A. Lichens, part 1, p. 22.

were of two kinds, the entire thallus, and individual lobes (*fig. 1*). To obtain the best results they should all be of the latter kind, as owing to the constant breaking off of long plants it is impossible to be sure of results, or even to find the plants measured. About twenty-five measurements were thus lost because the mistake was made of measuring the whole plant, which later was broken up by the winter rains and winds.

Number	September	May	Growth	Per cent. of growth
116	3.0 cm	4.1 cm	1.1 cm	36.66 +
8218 A	34.0	38.0	4.0	11.76 +
B	6.0	7.5	1.5	25.00
C	6.0	8.8	2.8	46.66 +
96 A	28.0	32.5	4.5	16.07 +
B	16.0	25.0	9.0	56.25
C	8.0	10.0	2.0	25.00
6418 A	46.0	54.0	8.0	17.00 +
B	47.0	90.0	43.0	91.00 +
6505 A	5.0	7.3	2.3	46.00
B	8.0	11.3	3.3	41.25
C	3.5	5.3	1.8	51.42 +

Dismissing no. 6418 B, which may be due to the tearing of the long thallus by the winds, we see that the short lobes, 3 to 16 cm in length, show a rate of growth astonishing for lichens; but one to be expected where they grow under such favorable conditions. Taking those fronds of 16 cm or less in length, we find an average growth in length of 41 per cent. No measurements were made to ascertain the increase in width of the lobes.

It was intended to make an extended series of measurements on various lichens, but it was not possible to do so. However, measurements were made of a specimen of *Parmelia caperata* (L.) Ach. growing on the trunk of *Aesculus californicus*.

No. 5888	September 25	May 5	Growth
Longitudinal diameter.....	22.5 cm	24 cm	1.5 cm
Transverse diameter	21.0	22	1.0

The growth of this plant is really much greater than appears, as it is diffused over the entire margin of the circular thallus, and hence is difficult to express in percentages.

It is hoped that students in favorable localities may be induced by the above notes to undertake a series of measurements and observations on not only the very large foliaceous lichens, but also on the crustaceous lichens, many of which no doubt grow very rapidly.—ALBERT C. HERRE, *Stanford University, California.*